I.1

MATERIAL SAFETY DATA SHEET

PROPYLENE OXIDE

MSDS No. HCR001150

Rev. Date 11/03/90

ARCO CHEMICAL COMPANY
3801 WEST CHESTER PIKE
NEWTOWN SQUARE, PA. 19073

IMPORTANT: Read this MSDS before handling and disposing of this product and pass this information on to employees, customers, and users of this product

This product is covered by the OSHA Hazard Communication Rule and this document has been prepared in accord with the MSDS requirements of the rul

I. General

SEE SUPPLEMENT BEGINNING ON PAGE 6

Trade Name	PROPYLENE OXIDE
Other Names	1,2 EPOXYPROPANE; METHYL OXIRANE; PO

Telephone Numbers
EMERGENCY
800/424-9300 CHEMTREC
215/353-8300 ARCO CHEM
CUSTOMER SERVICE
800/321-7000 INFO ONLY

Chemical Family	ALKYL EPOXIDE
Generic Name	PROPYLENE OXIDE

DOT Hazardous Materials Proper Shipping Name
PROPYLENE OXIDE(RQ 100/45.4KG)

DOT Hazard Class
FLAMMABLE LIQUID

CAS No.	SEE SECTION IX	**Company ID No.**	E0001150O0	**UN/NA ID No.**	UN 1280

II. DANGER — Summary of Hazards

SEE SUPPLEMENT BEGINNING ON PAGE 6

PHYSICAL HAZARDS:	EXTREMELY FLAMMABLE LIQUID HIGHLY REACTIVE IN THE PRESENCE OF SEVERAL POTENTIAL CATALYTIC AGENTS.
ACUTE HEALTH EFFECTS: (SHORT-TERM)	SEVERE EYE IRRITANT SEVERE SKIN IRRITANT MODERATE INHALATION HAZARD SLIGHT SKIN ABSORPTION HAZARD SLIGHT INGESTION HAZARD
CHRONIC HEALTH EFFECTS: (LONG-TERM)	ANIMAL CARCINOGEN - SEE SUPPLEMENT.

III. Fire and Explosion

SEE SUPPLEMENT BEGINNING ON PAGE 6

Flash Point (Method)	Autoignition Temperature (Method)	Flammable Limits (% Vol. in Air) At Normal Atmospheric Temperature and Pressure
AP -35° F (TCC)	AP 840° F	Lower 1.7 Upper 36.5

Fire and Explosion Hazards	RELEASES FLAMMABLE VAPORS BELOW NORMAL AMBIENT TEMPERATURES. WHEN MIXED WITH AIR AND EXPOSED TO IGNITION SOURCE, VAPORS CAN BURN IN OPEN OR EXPLODE IF CONFINED. VAPORS MAY BE HEAVIER THAN AIR. MAY TRAVEL LONG DISTANCES ALONG GROUND BEFORE IGNITING/FLASHING BACK TO VAPOR SOURCE. DILUTING WITH WATER MAY NOT SUFFICE TO RAISE FLASH POINT ABOVE AMBIENT TEMPERATURES.
Extinguishing Media	DRY CHEMICAL ALCOHOL TYPE FOAM USE WATER SPRAY/WATER FOG FOR COOLING
Special Firefighting Procedures	SEE SUPPLEMENT

IV. Health Hazards

SEE SUPPLEMENT BEGINNING ON PAGE 6

Summary of Acute Hazards: HIGH HEALTH HAZARD - SEE BELOW FOR ROUTE-SPECIFIC DETAILS.

ROUTE OF EXPOSURE	SIGNS AND SYMPTOMS	Primary Route(s)
Inhalation	OVEREXPOSURE MAY CAUSE IRRITATION TO THE RESPIRATORY TRACT AND TO OTHER MUCOUS MEMBRANES.	☒
Eye Contact	MAY CAUSE SEVERE EYE IRRITATION.	☒
Skin Absorption	EXTENSIVE/PROLONGED OR REPEATED EXPOSURE TO THIS MATERIAL CAN RESULT IN SIGNIFICANT ABSORPTION.	☐
Skin Irritation	MAY CAUSE IMMEDIATE SKIN IRRITATION AND BLISTERING.	☒
Ingestion	THIS MATERIAL MAY BE A SLIGHT HEALTH HAZARD IF INGESTED IN LARGE QUANTITIES.	☒
Summary of Chronic Hazards and Special Health Effects	THIS PRODUCT HAS BEEN SHOWN TO INDUCE TUMORS IN LABORATORY ANIMALS. SEE SUPPLEMENT. NO ADDITIONAL MEDICAL INFORMATION FOUND.	

V. Protective Equipment and Other Control Measures

Respiratory	DO NOT USE AIR-PURIFYING RESPIRATOR. ONLY NIOSH/MSHA APPROVED SUPPLIED AIR OR SELF-CONTAINED BREATHING APPARATUS OPERATED IN POSITIVE PRESSURE MODE ARE SATISFACTORY, IF EXPOSURE CAN EXCEED THE PEL/TLV.
Eye	EYE PROTECTION, INCLUDING BOTH CHEMICAL SPLASH GOGGLES AND FACE SHIELD, MUST BE WORN WHEN POSSIBILITY EXISTS FOR EYE CONTACT DUE TO SPRAYING LIQUID OR AIRBORNE PARTICLES. CONTACT LENSES MUST NOT BE WORN.
Skin	IMPERVIOUS PROTECTIVE SUIT WITH GLOVES, BOOTS, AND FULL HEAD AND FACE PROTECTION MUST BE WORN. THE EQUIPMENT MUST BE CLEANED THOROUGHLY AFTER EACH USE.
Engineering Controls	USE ONLY WHERE VENTILATION CAN CONTROL EXPOSURES TO WITHIN EXPOSURE STANDARD(S). SPECIAL ATTENTION SHOULD BE GIVEN TO LOW AREAS/PITS WHERE FLAMMABLE VAPORS CAN ACCUMULATE.
Other Hygienic and Work Practices	EMERGENCY EYE WASH FOUNTAINS AND SAFETY SHOWERS SHOULD BE AVAILABLE IN THE IMMEDIATE VICINITY OF ANY POTENTIAL EXPOSURE. NO SPECIAL WORK PRACTICES ARE NEEDED BEYOND THE ABOVE RECOMMENDATIONS UNDER ANTICIPATED CONDITIONS OF NORMAL USE.

VI. Occupational Exposure Limits

Substance	Source	Date	Type	Value/Units	Time
PROPYLENE OXIDE	ACGIH	1989	TWA	20 PPM	8 HRS
	OSHA	1989	TWA	20 PPM	8 HRS

VII. Emergency and First Aid

Inhalation	IF OVERCOME BY EXPOSURE, REMOVE VICTIM TO FRESH AIR IMMEDIATELY. GIVE OXYGEN OR ARTIFICIAL RESPIRATION AS NEEDED. OBTAIN EMERGENCY MEDICAL ATTENTION. PROMPT ACTION IS ESSENTIAL.
Eye Contact	IN CASE OF EYE CONTACT, IMMEDIATELY RINSE WITH CLEAN WATER FOR 20-30 MINUTES. RETRACT EYELIDS OFTEN. OBTAIN EMERGENCY MEDICAL ATTENTION.
Skin Contact	IMMEDIATELY REMOVE CONTAMINATED CLOTHING. WASH SKIN THOROUGHLY WITH MILD SOAP/WATER. FLUSH WITH LUKEWARM WATER FOR 15 MINUTES. IF STICKY, USE WATER-LESS CLEANER FIRST. OBTAIN EMERGENCY MEDICAL ATTENTION.
Ingestion	IF SWALLOWED, GIVE LUKEWARM WATER (PINT) IF VICTIM COMPLETELY CONSCIOUS/ ALERT. DO NOT INDUCE VOMITING/RISK OF DAMAGE TO LUNGS EXCEEDS POISONING RISK. OBTAIN EMERGENCY MEDICAL ATTENTION.
Emergency Medical Treatment Procedures	CONTINUE TO RINSE EYE WITH CLEAN WATER FOR 20-30 MINUTES, RETRACTING EYELIDS OFTEN. CONTACT OPTHALMOLOGIST IMMEDIATELY. TREAT BURNS OR ALLERGIC REACTIONS CONVENTIONALLY AFTER DECONTAMINATION.

VIII. Spill and Disposal

Precautions if Material is Spilled or Released	EXTREMELY FLAMMABLE LIQUID. RELEASE CAUSES IMMEDIATE FIRE/EXPLOSION HAZARD. LIQUIDS/VAPORS MAY IGNITE. EVACUATE/LIMIT ACCESS. EQUIP RESPONDERS WITH PROPER PROTECTION. EXTINGUISH ALL IGNITION SOURCES. STOP RELEASE. PREVENT FLOW TO SEWERS/PUBLIC WATERS. RESTRICT WATER USE FOR CLEANUP. NOTIFY FIRE/ENVIRONMENTAL AUTHORITIES. IMPOUND/RECOVER LARGE LAND SPILL. BLANKET WITH FIREFIGHTING FOAM. SOAK UP SMALL SPILL WITH INERT SOLIDS. USE SUITABLE DISPOSAL CONTAINERS. ON WATER, MATERIAL IS SOLUBLE AND MAY FLOAT OR SINK. MAY BIODEGRADE. CONTAIN AND MINIMIZE DISPERSION; COLLECT. DISPERSE RESIDUE. REPORT PER REGULATORY REQUIREMENTS.
Waste Disposal Methods	CONTAMINATED PRODUCT/SOIL/WATER MAY BE RCRA/OSHA HAZARDOUS WASTE (SEE 40 CFR 261 AND 29 CFR 1910). BURN CONCENTRATED LIQUIDS IN SYSTEMS DESIGNED FOR LOW FLASH POINT MATERIAL. AVOID FLAMEOUTS. DILUTE AQUEOUS WASTE MAY BIODEGRADE. CONCENTRATED/RAW LIQUID WASTE MAY REQUIRE 100 FOLD DILUTION OR MORE TO RAISE FLASH POINT TO SAFE LEVEL BEFORE DISCHARGE TO TREATMENT FACILITY. AVOID OVERLOADING/POISONING PLANT BIOMASS. ASSURE EFFLUENT COMPLIES WITH APPLICABLE REGULATIONS.

IX. Components

{This may not be a complete list of components}

Component Name	CAS No.	Carcinogen##		Composition amount (Wt.) (See Qualification on Page 4
PROPYLENE OXIDE	75-56-9	1,2, ,4	AP	100 PERCENT

Compositions given are typical values, not specifications.

##Listed By: 1 = NTP, 2 = IARC, 3 = OSHA, 4 = Other

X. Physical and Chemical Data

Boiling Point (At 760.0 mm Hg) AP 94° F	**Viscosity Units, Temp. (Method)** LT 1 CPS AT 70° F (BROOK)		**Dry Point** N/AP
Freezing Point -169° F	**Vapor Pressure** (MM HG AT 68° F) 440		**Volatile Characteristics** MODERATE
Specific Gravity (H_2O = 1 at 39.2° F) AP 0.83	**Vapor Sp. Gr. (Air = 1.0 at 60° - 90° F)** AP 2.0	**Solubility in Water** APPRECIABLE	**pH** N/AP
Hazardous Polymerization MAY OCCUR	**Other Chemical Reactivity** ANHYDROUS METAL CHLORIDES; PEROXIDES		**Stability** STABLE

Other Physical and Chemical Properties	N/P
Appearance and Odor	CLEAR, COLORLESS LIQUID; ETHEREAL ODOR ODOR THRESHOLD 200 PPM.
Conditions to Avoid	HEAT, SPARKS, OPEN FLAME, OXIDIZING CONDITIONS
Materials to Avoid	STRONG ACIDS, BASES, PEROXIDES, ANHYDROUS METAL CHLORIDES, COPPER AND ITS ALLOYS, BRASS, BRONZE, AND OTHER ACETYLIDE FORMING METALS.
Hazardous Decomposition Products	INCOMPLETE COMBUSTION WILL GENERATE HIGHLY POISONOUS CARBON MONOXIDE AND PERHAPS OTHER TOXIC VAPORS

XI. Additional Precautions

Handling, Storage and Decontamination Procedures	STORE IN TIGHTLY CLOSED/PROPERLY VENTED CONTAINERS AWAY FROM HEAT, SPARKS, OPEN FLAME, STRONG OXIDIZING AGENTS. USE ONLY NON-SPARKING TOOLS. STORE DRUMS WITH BUNG IN UP POSITION. CAREFULLY VENT INTERNAL PRESSURE BEFORE REMOVING CLOSURE. CONTAINERS MUST BE GROUNDED BEFORE BEGINNING TRANSFER. ELECTRICAL EQUIPMENT SHOULD CONFORM TO NATIONAL ELECTRIC CODE. HANDLE "EMPTY" CONTAINERS WITH CARE/VAPOR RESIDUE MAY BE FLAMMABLE. VAPOR SPACE ABOVE LIQUID MAY BE FLAMMABLE/EXPLOSIVE UNLESS BLANKETED WITH INERT GAS. ISOLATE, VENT, DRAIN, WASH AND PURGE SYSTEMS OR EQUIPMENT BEFORE MAINTENANCE OR REPAIR. REMOVE ALL IGNITION SOURCES. CHECK ATMOSPHERE FOR EXPLOSIVENESS AND OXYGEN DEFICIENCIES. USE ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. OBSERVE PRECAUTIONS PERTAINING TO CONFINED SPACE ENTRY.
General Comments	SOME OF THE INFORMATION PRESENTED AND CONCLUSIONS DRAWN HEREIN ARE FROM SOURCES OTHER THAN DIRECT TEST DATA ON THE PRODUCT ITSELF.

- - - Note - - - Qualifications:

EQ = Equal	AP = Approximately	N/P = No Applicable Information Found
LT = Less Than	UK = Unknown	N/AP = Not Applicable
GT = Greater Than	TR = Trace	N/DA = No Data Available

Disclaimer of Liability

The information in this MSDS was obtained from sources which we believe are reliable. **HOWEVER, THE INFORMATION IS PROVIDED WITHOUT ANY WARRANTY, EXPRESS OR IMPLIED, REGARDING ITS CORRECTNESS.**

The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. **FOR THIS AND OTHER REASONS, WE DO NOT ASSUME RESPONSIBILITY AND EXPRESSLY DISCLAIM LIABILITY FOR LOSS, DAMAGE OR EXPENSE ARISING OUT OF OR IN ANY WAY CONNECTED WITH THE HANDLING, STORAGE, USE OR DISPOSAL OF THE PRODUCT.**

This MSDS was prepared and is to be used only for this product. If the product is used as a component in another product, this MSDS information may not be applicable.

XII. Regulatory Information

SUPERFUND AMENDMENTS AND REAUTHORIAZATION ACT OF 1986 (SARA), TITLE III

SECTION 311/312 HAZARD CATEGORIES

IMMEDIATE (ACUTE) HEALTH HAZARD — DELAYED (CHRONIC) HEALTH HAZARD
FIRE HAZARD — REACTIVE

SECTION 313

THIS PRODUCT CONTAINS THE FOLLOWING CHEMICALS SUBJECT TO THE REPORTING REQUIREMENTS OF SARA TITLE III, SECTION 313 AND 40 CFR 372:

PROPYLENE OXIDE

TOXIC SUBSTANCES CONTROL ACT (TSCA)

ALL COMPONENTS OF THIS PRODUCT ARE LISTED ON THE TSCA INVENTORY.

COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA)

THIS PRODUCT CONTAINS THE FOLLOWING CHEMICALS SUBJECT TO THE REPORTING REQUIREMENTS OF CERCLA:

	REPORTABLE QUANTITY (RQ), LBS
PROPYLENE OXIDE	100#/45.4KG

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 - PROPOSITION 65

THIS PRODUCT CONTAINS THE FOLLOWING CHEMICAL(S) LISTED BY THE STATE OF CALIFORNIA AS "KNOWN TO THE STATE TO CAUSE CANCER":

PROPYLENE OXIDE

XIII. Label Information

Manufacturer: ARCO CHEMICAL COMPANY
3801 WEST CHESTER PIKE
NEWTOWN SQUARE, PA. 19073

Telephone Numbers
EMERGENCY
800/424-9300 CHEMTREC
215/353-8300 ARCO CHEM
CUSTOMER SERVICE
800/321-7000 INFO ONLY

Use Statement: FOR INDUSTRIAL USE ONLY
KEEP OUT OF REACH OF CHILDREN

Signal Word: DANGER

Physical Hazards:
EXTREMELY FLAMMABLE

Health Hazards:
SEVERE SKIN AND EYE IRRITANT
INGESTION AND INHALATION HAZARD
HAS BEEN FOUND TO CAUSE CANCER IN LAB ANIMALS.

Precautionary Measures:
DO NOT HANDLE NEAR HEAT, SPARKS, OR OPEN FLAME.
KEEP CONTAINER CLOSED WHEN NOT IN USE.
DO NOT STORE NEAR COMBUSTIBLE MATERIALS.
AVOID CONTACT WITH EYES, SKIN, AND CLOTHING.
AVOID PROLONGED OR REPEATED BREATHING OF VAPOR.
USE ONLY WITH ADEQUATE VENTILATION/PERSONAL PROTECTION.
PREVENT CONTACT WITH FOOD, CHEWING, OR SMOKING MATERIALS.
WASH THOROUGHLY AFTER HANDLING.
DO NOT TASTE/SWALLOW.

DOT Information:
UN/NA ID Number- UN 1280
Hazard Class- FLAMMABLE LIQUID
Proper Shipping- PROPYLENE OXIDE(RQ 100/45.4KG)

Component Name	CAS Number
PROPYLENE OXIDE	75-56-9

Instructions:
In case of fire, use- DRY CHEMICAL
ALCOHOL TYPE FOAM

First Aid -Inhalation IF OVERCOME BY EXPOSURE, REMOVE VICTIM TO FRESH AIR IMMEDIATELY. GIVE OXYGEN OR ARTIFICIAL RESPIRATION AS NEEDED. OBTAIN EMERGENCY MEDICAL ATTENTION. PROMPT ACTION IS ESSENTIAL.

-Eye Contact IN CASE OF EYE CONTACT, IMMEDIATELY RINSE WITH CLEAN WATER FOR 20-30 MINUTES. RETRACT EYELIDS OFTEN. OBTAIN EMERGENCY MEDICAL ATTENTION.

-Skin Contact IMMEDIATELY REMOVE CONTAMINATED CLOTHING. WASH SKIN THOROUGHLY WITH MILD SOAP/WATER. FLUSH WITH LUKEWARM WATER FOR 15 MINUTES. IF STICKY, USE WATER-LESS CLEANER FIRST. OBTAIN EMERGENCY MEDICAL ATTENTION.

-Ingestion IF SWALLOWED, GIVE LUKEWARM WATER (PINT) IF VICTIM COMPLETELY CONSCIOUS/ ALERT. DO NOT INDUCE VOMITING/RISK OF DAMAGE TO LUNGS EXCEEDS POISONING RISK. OBTAIN EMERGENCY MEDICAL ATTENTION.

In case of spill, EXTREMELY FLAMMABLE LIQUID. RELEASE CAUSES IMMEDIATE FIRE/EXPLOSION HAZARD. EXTINGUISH ALL IGNITION SOURCES. IMPOUND/RECOVER LARGE LAND SPILL; SOAK UP SMALL SPILL. ON WATER, MAY BIODEGRADE. CONTAIN/MINIMIZE DISPERSION/COLLECT. REPORT PER REGULATORY REQUIREMENTS.

Protective Equipment:

-Respiratory USE NIOSH/MSHA APPROVED SUPPLIED AIR OR SELF-CONTAINED BREATHING APPARATI

-Eye BOTH CHEMICAL SPLASH GOGGLES AND FACE SHIELD.

-Skin IMPERVIOUS PROTECTIVE SUIT PLUS IMPERVIOUS GLOVES, BOOTS, AND FULL HEAD/FACE PROTECTION.

XIV. Supplement

SUMMARY OF HEALTH HAZARDS

A CHRONIC (28-MONTH) STUDY INTO THE POSSIBLE TOXIC AND CARCINOGENIC PROPERTIES OF INHALED PROPYLENE OXIDE WAS PERFORMED IN RATS. FOUR GROUPS OF RATS, INITIALLY CONSISTING OF 100 MALES AND 100 FEMALES EACH, WERE EXPOSED TO ATMOSPHERES CONTAINING 0,30,100, OR 300 PPM PROPYLENE OXIDE RESPECTIVELY. FOR 6 HOURS PER DAY, 5 DAYS PER WEEK, FOR A PERIOD OF 124 WEEKS FOR MALES AND 123 WEEKS FOR FEMALES. AFTER 12, 18, AND 24 MONTHS, 10 RATS/SEX/GROUP WERE KILLED FOR INTERIM INFORMATION. MAIN CONCLUSIONS WERE THAT UNDER THE CONDITIONS OF THE PRESENT LONG-TERM REPEATED EXPOSURE STUDY:

- PROPYLENE OXIDE AT LEVELS OF 100 AND 300 PPM MAY CAUSE INCREASED MORTALITY IN RATS
- PROPYLENE OXIDE AT THE LEVELS TESTED WAS A MILD IRRITANT FOR THE NOSE OF RATS
- PROPYLENE OXIDE AT LEVELS OF 30 PPM AND ABOVE INCREASED THE NORMAL TUMOR RESPONSE OF THE MAMMARY GLANDS IN FEMALE RATS
- PROPYLENE OXIDE AT A LEVEL OF 300 PPM INCREASED THE OVERALL INCIDENCE OF MALIGNANT TUMORS IN RATS

THE NTP,IN A 2 YEAR CARCINOGENICITY STUDY, EXPOSED RATS AND MICE TO 0, 200 OR 400 PPM OF PROPYLENE OXIDE, 6 HRS/DAY, 5 DAYS/WEEK. TUMORS OF THE NASAL EPITHELIUM WERE REPORTED IN BOTH RATS AND MICE EXPOSED TO 400 PPM. THE INCIDENCE OF UTERINE TUMORS APPEARED TO BE INCREASED IN THE FEMALE RATS.

ALTHOUGH THERE ARE NO PUBLISHED EPIDEMIOLOGY STUDIES RELATING PROPYLENE OXIDE TO CHRONIC HEALTH EFFECTS, THE ANIMAL STUDIES DO INDICATE A TUMORIGENIC EFFECT AFTER "LIFE TIME" EXPOSURES TO LEVELS OF PROPYLENE OXIDE EXCEEDING THE ACGIH TLV.

SPECIAL FIREFIGHTING PROCEDURES

DO NOT ENTER FIRE AREA WITHOUT PROPER PROTECTION. SEE SECTION X - DECOMPOSITION PRODUCTS POSSIBLE. FIGHT FIRE FROM SAFE DISTANCE/PROTECTED LOCATION. HEAT MAY BUILD PRESSURE/RUPTURE CLOSED CONTAINERS, SPREADING FIRE, INCREASING RISK OF BURNS OR INJURIES. WHERE RECOMMENDED TYPE FOAM IS NOT AVAILABLE IN SUFFICIENT QUANTITY OR PRACTICAL FOR USE ON A PARTICULAR FIRE, CUT OFF SUPPLY OF FUEL TO FIRE, MAINTAIN WATER SPRAY OR WATER FOG TO PREVENT SPREADING, AND ALLOW FIRE TO BURN ITSELF OUT. NOTIFY AUTHORITIES IF LIQUID ENTERS SEWER OR PUBLIC WATERS.
TEST RESULTS INDICATE THAT ALCOHOL RESISTANT FORM IS MOST EFFECTIVE IN FIGHTING PROPYLENE OXIDE FIRES.

NOTICE TO DEPOSITORS-40 CFR PART 280-UNDERGROUND STORAGE TANK REGULATIONS

A NEW FEDERAL LAW REQUIRES OWNERS OF UNDERGROUND TANKS, USED TO STORE PETROLEUM OR CERCLA HAZARDOUS SUBSTANCES, TO NOTIFY DESIGNATED STATE OR LOCAL AGENCIES BY MAY 8, 1986 OF THE EXISTENCE OF THEIR TANKS. NOTIFICATIONS FOR TANKS BROUGHT INTO USE AFTER MAY 8, 1986 MUST BE MADE WITHIN 30 DAYS. CONSULT EPA'S REGULATIONS, ISSUED ON NOVEMBER 8, 1985, TO DETERMINE WHETHER YOU ARE AFFECTED BY THIS LAW.

NATIONAL PAINT & COATINGS ASSOCIATION'S HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH	3*
FLAMMABILITY	4
REACTIVITY	2
PERSONAL PROTECTION**	X

* THERE ARE CHRONIC HEALTH HAZARDS AS WELL AS ACUTE HAZARDS ASSOCIATED WITH THIS PRODUCT. CONSULT MSDS FOR MORE INFORMATION.
** PERSONAL PROTECTION RECOMMENDATIONS SHOULD BE REVIEWED BY PURCHASERS. WORKPLACE CONDITIONS ARE AN IMPORTANT FACTOR IN SPECIFYING ADEQUATE PROTECTION.

XIV. Supplement Continued

I.1

BASF Corporation

BASF

MATERIAL SAFETY DATA SHEET

BASF CORPORATION
100 CHERRY HILL ROAD

PARSIPPANY, NJ 07054
(201) 316-3000

Original Date: 08/23/1991
Revision Date: 08/23/1991

Emergency Telephone: (800) 424-9300 (CHEMTREC)
(800) 832-HELP (BASF Hotline)

BOTH NUMBERS ARE AVAILABLE DAYS, NIGHTS, WEEKENDS, & HOLIDAYS.

SECTION 1 - PRODUCT INFORMATION

Product ID: NVS 588140 **Name:** EO PURIFIED

Tradename:
ETHYLENE OXIDE PURIFIED

Common Chemical Name:
1,2 EPOXYETHANE

Synonyms:
EO, ETO

Molecular Formula:

Molecular Wt.: 44.1

Chemical Family: Alkylene Oxide

SECTION 2 - INGREDIENTS

Chemical Name:		CAS Number:	Amount:	PEL/TLV Data:		
ETHYLENE OXIDE	I N H P C	75-21-8	100.0 %	OSHA STEL FINAL	5	PPM
				OSHA TWA FINAL	1	PPM
				ACGIH TWA	1	PPM

Product ID: NVS 588140 **Name:** EO PURIFIED

SECTION 2 - INGREDIENTS

Chemical Name:	CAS Number:	Amount:	PEL/TLV Data:

I - Denotes an IARC listed carcinogen
N - Denotes an NTP listed carcinogen
O - Denotes an OSHA carcinogen
H - Denotes an OSHA health hazard
P - Denotes an OSHA physical hazard
C - Denotes a CERCLA listed chemical

See section 10A for SARA-313 list.

SECTION 3 - PHYSICAL PROPERTIES

Color:	Water White
Form/Appearance:	Liquid
Odor:	Etherlike
Odor Intensity:	Moderate

	Typical	Low-RANGE-High	Unit of Measure
Spc. Gravity:	0.891		
Bulk Density:	7.2500		LB/GAL
pH:	NOT AVAILABLE		

	Typical	Low-RANGE-High	Deg.	@ Pressure
Boiling Pt:	51.3		F	760.0 MM HG
Freezing Pt:	NOT AVAILABLE			
Decomp. Tmp:	NOT AVAILABLE			

Solubility in Water Description: Complete

SECTION 4 - FIRE AND EXPLOSION DATA

	Typical	Low-RANGE-High	Deg.	Method
Flash Point:	-35.0		F	CLEVELAND OPEN CUP
Autoignition:	800.0		F	NONE SPECIFIED

SECTION 4 - FIRE AND EXPLOSION DATA (Cont.)

Extinguishing Media:
Use water fog or alcohol foam extinguishing media.

Fire Fighting Procedures:
Firefighters should be equipped with self-contained breathing apparatus and turn out gear.

Unusual Hazards:
Violent self-polymerization can occur if overheated (>125 F) in a container. Vapor is heavier than air and may be ignited at a distance and flash back. Vapor can explode in the absence of air, if ignited or overheated (1000 F). Liquid or vapor can be ignited by static electricity. Evacuate 5000 feet if explosion is imminent.

SECTION 5 - HEALTH EFFECTS

Routes of entry for solids and liquids include eye and skin contact, ingestion and inhalation. Routes of entry for gasses include inhalation and eye and skin contact.

Toxicology Test Data:
Rat, Oral LD50 - 72 MG/KG
Very Toxic
Dog, Inhalation LC50 @ 4 hours - 960 PPM
TOX TEST RATING NOT FOUND

Acute Overexposure Effects:
This material is corrosive to the body tissues. Skin contact with the liquid may result in dermatitis and deep burns. Eye contact may result in burns and permanent injury. Inhalation of mists causes irritation of the respiratory tract and inflammation of the lungs may result. Ingestion may cause moderate to severe gastric irritation including nausea, vomiting and pain. Ulceration or perforation of the gastrointestinal tract may occur.
High vapor concentrations of ethylene oxide (EO) can cause CNS depression, pulmonary irritation, nausea, chemical pneumonitis, and possible pulmonary edema and death.

SECTION 5 - HEALTH EFFECTS (Cont.)

Chronic Overexposure Effects:
A chronic inhalation study has shown that EO increases the incidence of cancer in experimental animals. NTP has included EO in its Annual Report on Carcinogens and IARC has included it in Group 2A (limited evidence of carcinogenicity in humans). Studies have shown that EO is a mutagenic agent. At high levels, it caused adverse effects to reproductive systems in animals. There is limited evidene of an increased rate of spontaneous abortions among pregnant women who work with EO.

First Aid Procedures - Skin:
Wash affected areas with soap and water. Remove and launder contaminated clothing before reuse. Get immediate medical attention.

First Aid Procedures - Eyes:
Immediately wash eyes with running water for 15 minutes. Get immediate medical attention.

First Aid Procedures - Ingestion:
If swallowed, dilute with water. DO NOT INDUCE VOMITING. Never give fluids or induce vomiting if the victim is unconscious or having convulsions. Get immediate medical attention.

First Aid Procedures - Inhalation:
Move to fresh air. Aid in breathing, if necessary, and get immediate medical attention.

First Aid Procedures - Notes to Physicians:
None known.

First Aid Procedures - Aggravated Medical Conditions:
No data is available which addresses medical conditions that are generally recognized as being aggravated by exposure to this product. Please refer to Section 5 (Effects of Overexposure) for effects observed in animals.

First Aid Procedures - Special Precautions:
Institute means to alert and evacuate employees during potential exposures as a result of an emergency. Institute a medical surveillance program for employees who were or are apt to be exposed above the PEL for 30 or more days in a year. Institute a training program for employees who may be exposed to EO above the PEL.

SECTION 6 - REACTIVITY DATA

Reactivity - Stability Data:
Unstable

Reactivity - Incompatability:
Strong acids, bases, alkali metals and aluminum oxide.

Reactivity - Conditions/Hazards to Avoid:
Avoid heat, rust, air and long storage periods (over 3 months). Avoid high temperatures (100 F) or contamination with the above mentioned chemicals.

Reactivity - Hazardous Decomposition/Polymerization:
Hazardous Polymerization: May polymerize with explosive violence.

Reactivity - Corrosive Properties:
Not corrosive.

Reactivity - Oxidizer Properties:
Not an oxidizer

SECTION 7 - PERSONAL PROTECTION

Personal Protection - Clothing:
Gloves, coveralls, apron, boots as necessary to prevent contact.

Personal Protection - Eyes:
Chemical goggles; also wear a face shield if splashing hazard exists.

Personal Protection - Respiration:
As required by 29 CFR 1910.1047. The employer must provide an approved respirator or air-supplied hoods where controls are not feasible or are not adequate to reduce exposure levels to the P.E.L. of 1 ppm (8 hr TWA); and for emergency situations.

Personal Protection - Ventilation:
Explosion proof vent (Class I, Group B)

SECTION 7 - PERSONAL PROTECTION (Cont.)

Personal Protection - Explosion Proofing:
None required.

Other Personal Protection Data:
As required by 29 CFR 1910.1047. Develop a written plan for emergenices.

SECTION 8 - SPILL-LEAK/ENVIRONMENTAL

Spill/Leak Procedures - General:
Ethylene oxide is a regulated product. Evacuate personnel and extinguish sources of ignition nearby and downwind. Vapors are heavy and can collect in low areas. Wear protective clothing and proper breathing apparatus near vapors. Notify proper authorities including National Response Center (1-800-427-8802).
LEAKS: Spray with water until container can be emptied.
SMALL AMOUNTS: Allow to evaporate or dilute with water to 4% EO and dispose of as indicated for large amounts.
LARGE SPILLS: Dilute to 4% EO with water. Pump into reactor and convert EO to glycol with caustic catalyst. Neutralize catalyst and dispose of glycol solution in a biologically active treatment works with a RCRA TSD facility permit. Empty EO drums are returnable to the supplier.

Spill/Leak Procedures - Waste Disposal:
Incinerate or bury in a RCRA licensed facility. Do not discharge into waterways or sewer systems without proper authority.

Spill/Leak Procedures - Container Disposal:
Empty containers with less than 1 inch of residue may be landfilled at a licensed facility. Recommend crushing or other means to prevent unauthorized reuse. Other containers must be disposed of in a RCRA licensed facility.

Environmental Toxicity Test Data:
Acute Aquatic Toxicity, 96 hr LC50 - 10-100 PPM
TEST RATING NOT FOUND

Product ID: NVS 588140 **Name:** EO PURIFIED

SECTION 9 - STORAGE AND HANDLING

Storage and Handling - General:
Store in a cool area, in closed containers, pressurized with nitrogen. All electrical equipment must be explosive proof (Class I, Group B). NO SMOKING signs etc. should be displayed.

SECTION 10A - FEDERAL REGULATORY INFORMATION

TSCA Inventory Status:
Listed on Inventory: YES

SARA - 313 Listed Chemicals:

CAS #:	NAME:	Amount:
75-21-8	ETHYLENE OXIDE	100.0 %

RCRA Haz. Waste No.: U115
CERCLA: YES **Reportable Qty.: (If YES)** 10 LBS

SECTION 10B - STATE REGULATORY INFORMATION

State Regulatory Information: (By Component) **NJ/PA/MA RTK**
CAS #: 75-21-8 **Name:** ETHYLENE OXIDE YES

This product contains one or more chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

SECTION 10C - OTHER REGULATORY INFORMATION

FEMA Approved: NO **No:** X
RIFM Approved: NO **No:** X

Product ID: NVS 588140 **Name:** EO PURIFIED

SECTION 10C - OTHER REGULATORY INFORMATION (Cont.)

IFRA Guidline: NO
Product Grades: USP: NF: FCC:
FDA Approved: NO **Use:**

Product ID: NVS 588140 **Name:** EO PURIFIED

SECTION 11 - TRANSPORTATION INFORMATION

DOT Proper Shipping Name:

ETHYLENE OXIDE

DOT Technical Name:

N/A

DOT Primary Hazard Class:

2.3 (POISON GAS)

DOT Secondary Hazard Class:

2.1 (FLAMMABLE GAS)

DOT Label Required:

POISON GAS - FLAMMABLE GAS

DOT Placard Required:

"1040" POISON GAS - FLAMMABLE GAS

DOT Poison Constituent:

ETHYLENE OXIDE

BASF Commodity Codes: 110 110 **UN/NA Code:** 1040 **E/R Guide:** 69

Bill of Lading Description:

ETHYLENE OXIDE, 2.3, (2.1), UN 1040, POISON-INHALATION HAZARD, HAZARD ZONE C, RQ 10 LBS, ERG 69, STCC 49-066-10, PLACARDED: POISON GAS, PLACARDED: FLAMMABLE GAS

	CLASS:	P. G.	SHIPPING NAME:
IATA:	2, 6.1, 3		ETHYLENE OXIDE, UN 1040
IMO:	2, 6.1, 3		ETHYLENE OXIDE, UN 1040
TDG:	2, 6.1, 3		ETHYLENE OXIDE, UN 1040

Product ID: NVS 588140 **Name:** EO PURIFIED

SECTION 13 - MANUFACTURER'S INFORMATION

WHILE BASF CORPORATION BELIEVES THE DATA SET FORTH HEREIN ARE ACCURATE AS THE DATE HEREOF, BASF CORPORATION MAKES NO WARRANTY WITH RESPECT THERETO AND EXPRESSINGLY DISCLAIMS ALL LIABILITY FOR RELIANCE THEREON. SUCH DATA ARE OFFERED SOLELY FOR CONSIDERATION, INVESTIGATION, AND VERIFICATION.

END OF DATA SHEET

NOAA Response Information Data Base

NOAA - 7600 SAND POINT WAY NE SEATTLE, WA 98115 (206) 526-6317
CHEMTREC (800) 424-9300 OR (202) 483-7616

Chemical Name: PROPYLENE OXIDE

CAS Number: 75569

NFPA Degrees of Hazard:

Health: 2 **Flammability:** 4
Reactivity: 2 **Special:**

General Description:

Propylene oxide is a clear, colorless, volatile liquid with an ethereal odor. It is used as a fumigant, in making detergents and lubricants, and to make other chemicals. It has a flash point of -35 deg. F. and boils at 95 deg. F. It is flammable over a wide range of vapor-air concentrations. If contaminated it may polymerize with evolution of heat and possible rupture of container. Vapors are irritating to eyes, skin, and respiratory system; prolonged contact with skin may result in delayed burns. It is lighter than water and soluble in water. The vapors are heavier than air. It weighs 6.9 pounds per gallon. (©AAR, 1990)

Physical Properties:

Flash Point: -35° F (cc) (EPA, 1990)
Lower Exp Limit: 2.8 % (EPA, 1990)
Upper Exp Limit: 37 % (EPA, 1990)
Auto Igtn Temp: 869° F (USCG, 1989)
Melting Point: -169.83° F (EPA, 1990)
Vapor Pressure: 445 mm at 68° F (EPA, 1990)
Vapor Density (air = 1): 2 (EPA, 1990)
Specific Gravity, Liquid: 0.859 at 32° F (EPA, 1990)
Boiling Point: 93.61° F at 760 mm (EPA, 1990)
Molecular Weight: 58.08 (EPA, 1990)
IDLH: 2000 ppm (NIOSH, 1987)

source of ignition and flash back. Vapors form explosive mixture with air. If polymerization takes place in container, there may be a violent rupture of container. Explosion hazard is severe when exposed to flame. Violently reacts with acetylide- forming metals such as copper or copper alloys, ammonium hydroxide; chlorosulfonic acid; hydrochloric acid; hydrofluoric acid; nitric acid; oleum and sulfuric acid. Hazardous polymerization may occur. Avoid active catalytic surfaces such as anhydrous chlorides of iron, tin, and aluminum; peroxides of iron and aluminum; and alkali metal hydroxides, high temperatures; alkalies; aqueous acids; amines and acidic alcohols. (EPA, 1990)

Health Hazards:

This material is moderately toxic by inhalation and ingestion. It may cause irreversible and reversible changes. Skin contact with the material or solutions of the material cause irritation; diluted solutions are more irritating than undiluted materials. Exposure may cause mild depression of the central nervous system and eye, nasal, and lung irritation. Contact with the liquid can cause blindness and death. Pulmonary edema may recur up to 2 weeks after exposure. (EPA, 1990)

Fire Fighting:

Firefighting should be done from a safe distance or from a protected location. Wear self-contained (positive pressure if available) breathing apparatus and full protective clothing. Isolate for 1/2 mile in all directions if tank car or truck is involved in fire. Move container from area if you can do so without risk. Spray cooling water on containers that are exposed to flames until well after fire is out. For massive fire in cargo area, use unmanned hose holder or monitor nozzles; if this is impossible, withdraw from area and let fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tank due to fire.

Extinguish with dry chemical, carbon dioxide, water spray, fog or foam. (EPA, 1990)

Non-Fire Response:

material out of water sources and sewers. Build dikes to contain flow as necessary. Attempt to stop leak if without undue personnel hazard. Use water spray to disperse vapors and dilute standing pools of liquid. Apply water spray or mist to knock down vapors. Land spill: Dig a pit, pond, lagoon, holding area to contain liquid or solid material. Dike surface flow using soil, sand bags, foamed polyurethane, or foamed concrete. Absorb bulk liquid with fly ash, cement powder, or commercial sorbents. Apply "universal" gelling agent to immobilize spill. Water spill: Use natural barriers or oil spill control booms to limit spill travel. Use surface active agent (e.g. detergent, soaps, alcohols), if approved by EPA. Inject "universal" gelling agent to solidify encircled spill and increase effectiveness of booms. If dissolved, in region of 10 ppm or greater concentration, apply activated carbon at ten times the spilled amount. Use mechanical dredges or lifts to remove immobilized masses of pollutants and precipitates. (©AAR, 1990)

Protective Clothing:

For emergency situations, wear a positive pressure, pressure-demand, full facepiece self-contained breathing apparatus (SCBA) or pressure-demand supplied air respirator with escape SCBA and a fully-encapsulating, chemical resistant suit. (EPA, 1990)

Butyl Rubber: Good Resistance / Limited Data
Viton/Neoprene: Poor Resistance / Limited Data
Natural Rubber: Poor Resistance / Good Data
Neoprene: Poor Resistance / Limited Data
Nitrile + Polyvinyl Chloride: Poor Resistance / Limited Data
Nitrile: Poor Resistance / Limited Data
Polyethylene (PE): Poor Resistance / Good Data
Polyvinyl Alcohol: Poor Resistance / Good Data
Polyvinyl Chloride (PVC): Poor Resistance / Limited Data
Viton: Poor Resistance / Good Data
Butyl Rubber/Neoprene: Poor Resistance / Limited Data
TEFLON: Good Resistance / Limited Data
[illegible]

First Aid

[illegible]

or burn the skin, eyes, and respiratory tract. Pulmonary edema may occur up to 2 weeks after exposure. Dermatitis (red, inflamed skin) is common. Other signs and symptoms of acute exposure may include headache, nausea, vomiting, and unconsciousness. Victims may appear as if they are in a drunken stupor.

Inhalation, skin and ingestion are routes of entry.

In Case of Inhalation :
1) Move victims to fresh air. Emergency personnel should avoid self-exposure to propylene oxide.
2) Evaluate vital signs including pulse and respiratory rate, and note any trauma. If no pulse is detected, provide CPR. If not breathing, provide artificial respiration. If breathing is labored, administer oxygen or other respiratory support.
3) Obtain authorization and/or further instructions from the local hospital for administration of an antidote or performance of other invasive procedures.
4) Transport to a health care facility.

In Case of Dermal/Eye Exposure :
1) Remove victims from exposure. Emergency personnel should avoid self-exposure to propylene oxide.
2) Evaluate vital signs including pulse and respiratory rate, and note any trauma. If no pulse is detected, provide CPR. If not breathing, provide artificial respiration. If breathing is labored, administer oxygen or other respiratory support.
3) Remove contaminated clothing as soon as possible.
4) If eye exposure has occurred, eyes must be flushed with lukewarm water for at least 15 minutes.
5) Wash exposed skin areas THOROUGHLY with soap and water.
6) Obtain authorization and/or further instructions from the local hospital for administration of an antidote or performance of other invasive procedures.
7) Transport to a health care facility.

In Case of Ingestion :
Evaluate vital signs including pulse and respiratory rate, and note
[illegible] pulse is detected, provide CPR. If not breathing,
[illegible] breathing is labored, administer

oxygen or other respiratory support.
2) DO NOT induce vomiting or attempt to neutralize!
3) Obtain authorization and/or further instructions from the local hospital for administration of an antidote or performance of other invasive procedures.
4) Activated charcoal may be administered if victims are conscious and alert. Use 15 to 30 g (1/2 to 1 oz) for children, 50 to 100 g (1-3/4 to 3-1/2 oz) for adults, with 125 to 250 mL (1/2 to 1 cup) of water.
5) Promote excretion by administering a saline cathartic or sorbitol to conscious and alert victims. Children require 15 to 30 g (1/2 to 1 oz) of cathartic; 50 to 100 g (1-3/4 to 3-1/2 oz) is recommended for adults.
6) Transport to a health care facility. (EPA, 1990)

NOAA Response Information Data Base

NOAA - 7600 SAND POINT WAY NE SEATTLE, WA 98115 (206) 526-6317
CHEMTREC (800) 424-9300 OR (202) 483-7616

Chemical Name: ETHYLENE OXIDE

CAS Number: 75218

NFPA Degrees of Hazard:

Health:	2	**Flammability:**	4
Reactivity:	3	**Special:**	

General Description:

Ethylene oxide is a clear, colorless, volatile liquid with an ethereal odor. It is used to make other chemicals, as a fumigant and industrial sterilant. It has a flash point of less than 0 deg. F., and is flammable over a wide vapor-air concentration range. The material has to be diluted on the order of 24 to 1 with water before the liquid loses its flammability. If contaminated it may polymerize violently with evolution of heat and rupture of its container. The vapors may burn inside a container. The vapors are irritating to the eyes, skin, and respiratory system. Prolonged contact with the skin may result in delayed burns. It is lighter than water and soluble in water. The vapors are heavier than air. (©AAR, 1990)

Physical Properties:

Flash Point: Greater than -0.4F, but less than 0F (0C). (EPA, 1990)
Lower Exp Limit: 3 % (EPA, 1990)
Upper Exp Limit: 100 % (EPA, 1990)
Auto Igtn Temp: 804° F (USCG, 1989)
Melting Point: -170.5° F (EPA, 1990)
Vapor Pressure: 1095 mm at 68° F (EPA, 1990)
Vapor Density (air = 1): 1.49 (EPA, 1990)
Specific Gravity, Liquid: 0.8222 at 50° F (EPA, 1990)
Boiling Point: 51.3° F at 760 mm (EPA, 1990)
Molecular Weight: 44.06 (EPA, 1990)
IDLH: Not applicable, potential human carcinogen. (NIOSH, 1987)
TLV TWA: 1 ppm Suspected human carcinogen. (©ACGIH, 1990)

Fire Hazard:

Severe explosion hazard when exposed to heat or flame. Irritating vapors are generated when heated. Vapor is heavier than air and may travel considerable distance to a source of ignition and flash back. Vapor forms explosive mixtures with air over a wide range. Liquid is not detonable but the vapor may be readily initiated into explosive decomposition. Avoid metal fittings containing copper, silver, mercury or magnesium; ammonia, oxidizing agents; acids, organic bases; amines; certain salts; alcohols; mercaptans, ferric chloride; magnesium perchlorate; m-nitroaniline; trimethylamine, potassium, tin chlorides; alkanethiols; bromoethane; aluminum chloride; aluminum oxide; iron chlorides; and iron oxides. Avoid air, heat, acids and bases, metal or metal chloride catalysts. Hazardous polymerization may occur. Avoid acids; covalent halides such as chlorides of aluminum, iron (III), tin (IV); basic materials like alkali hydrides, ammonia, amines, and potassium; catalytically active solids such as aluminum or iron oxides or rust, chlorides of boron, aluminum, tin, and iron; some carbonates; and metals such as copper and copper alloys (EPA, 1990)

Health Hazards:

It can cause death. Lowest inhalation concentration causing toxic effects is 12500 ppm/10 seconds. It is a strong skin irritant. Neurological disorders and even death have been reported. (EPA, 1990)

Fire Fighting:

Move container from fire area if you can do so without risk. Stay away from ends of tanks. Fight fire from maximum distance. For massive fire in cargo area, use unmanned hose holder or monitor nozzles; if this is impossible, withdraw from area and let fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tank due to fire. Isolate for 1 mile in all directions if tank car or truck is involved in fire. Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind; keep out of low areas. Wear positive pressure breathing apparatus and full protective clothing. Evacuate area endangered by gas.

Extinguish with alcohol foam, carbon dioxide, dry chemical or water spray, fog, or foam. Let burn unless leak can be stopped immediately. (EPA, 1990)

Non-Fire Response:

Keep sparks, flames, and other sources of ignition away. Keep material out of water sources and sewers. Build dikes to contain flow as necessary. Attempt to stop leak if without undue personnel hazard. Use water spray to disperse vapors and dilute standing pools of liquid. (©AAR, 1990)

Protective Clothing:

For emergency situations, wear a positive pressure, pressure-demand, full facepiece self-contained breathing apparatus (SCBA) or pressure-demand supplied air respirator with escape SCBA and a fully-encapsulating, chemical resistant suit. (EPA, 1990)

Butyl Rubber: Good Resistance / Limited Data
Chlorinated Polyethylene (CPE): Good Resistance / Limited Data
Neoprene: Poor Resistance / Limited Data
Nitrile: Poor Resistance / Good Data
Polyvinyl Chloride (PVC): Poor Resistance / Limited Data
Viton: Poor Resistance / Limited Data
(A.D. Little, 1987)

First Aid:

Warning: Ethylene oxide is corrosive to moist tissues. Caution is advised.

Signs and Symptoms of Acute Exposure : Signs and symptoms of acute exposure to ethylene oxide may be severe, and include dyspnea (shortness of breath), cough, pulmonary edema, pneumonia, and respiratory failure. Lethargy, headache, dizziness, twitching, convulsions, paralysis, and coma may be observed. Cardiac arrhythmias and cardiovascular collapse may also occur. Gastrointestinal effects of acute exposure may include nausea, vomiting, and abdominal pain. Ethylene oxide may severely irritate or burn mucous membranes and moist skin. Eye contact may result in conjunctivitis (red, inflamed eyes) and erosion of the cornea.

Inhalation, skin and ingestion are routes of entry.

In Case of Inhalation :
1) Move victims to fresh air. Emergency personnel should avoid self-exposure to ethylene oxide.
2) Evaluate vital signs including pulse and respiratory rate, and note any trauma. If no pulse is detected, provide CPR. If not breathing, provide artificial respiration. If breathing is labored, administer oxygen or other respiratory support.
3) Obtain authorization and/or further instructions from the local hospital for administration of an antidote or performance of other invasive procedures.
4) Transport to a health care facility.

In Case of Dermal/Eye Exposure :
1) Remove victims from exposure. Emergency personnel should avoid self-exposure to ethylene oxide.
2) Evaluate vital signs including pulse and respiratory rate, and note any trauma. If no pulse is detected, provide CPR. If not breathing, provide artificial respiration. If breathing is labored, administer oxygen or other respiratory support.
3) Remove contaminated clothing as soon as possible.
4) If eye exposure has occurred, eyes must be IMMEDIATELY flushed with lukewarm water for AT LEAST 15 minutes.
5) If liquid is spilled on the skin, allow ethylene oxide to vaporize before washing THOROUGHLY with soap and water.
6) Obtain authorization and/or further instructions from the local hospital for administration of an antidote or performance of other invasive procedures.
7) Transport to a health care facility.

In Case of Ingestion :
1) Evaluate vital signs including pulse and respiratory rate, and note any trauma. If no pulse is detected, provide CPR. If not breathing, provide artificial respiration. If breathing is labored, administer oxygen or other respiratory support.
2) Obtain authorization and/or further instructions from the local hospital for administration of an antidote or performance of other invasive procedures.
3) Give the victims water or milk: children up 1 year old, 125 mL (4 oz or 1/2 cup); children 1 to 12 years old 200 mL (6 oz or 3/4 cup); adults, 250 mL (8 oz or 1 cup). Water or milk should be given only if

victims are conscious and alert.

4) Activated charcoal may be administered if victims are conscious and alert. Use 15 to 30 g (1/2 to 1 oz) for children, 50 to 100 g (1-3/4 to 3-1/2 oz) for adults, with 125 to 250 mL (1/2 to 1 cup) of water.

5) Ethylene oxide generally acts as its own cathartic, however, if deemed necessary, excretion may be promoted by administering a saline cathartic or sorbitol to conscious and alert victims. Children require 15 to 30 g (1/2 to 1 oz) of cathartic, 50 to 100 g (1-3/4 to 3-1/2 oz) is recommended for adults.

6) Transport to a health care facility. (EPA, 1990)